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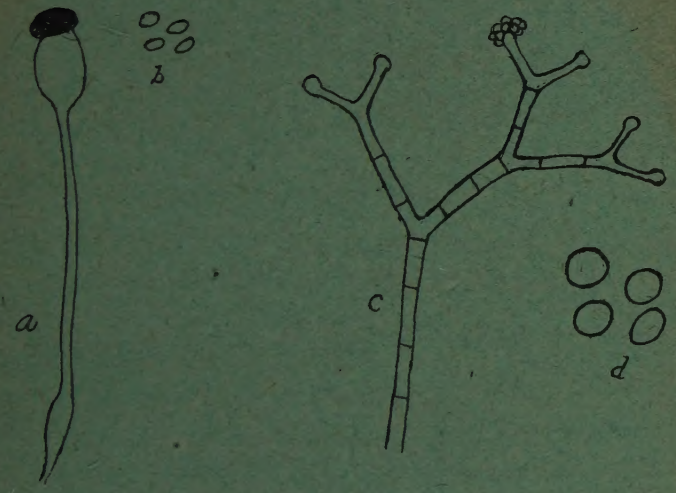

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THE EDITOR NEEDS LITTLE SPACE.

We print the concluding portion of Mr. Kauffman's admirable Key to the species of Cortinarius in this number. It can not fail to be very useful to those who have the courage to attack this difficult genus. Our species are so numerous that every one can take a turn at the Key—but we will not be surprised if some of the amateurs or even students later report to us that some things are easier to master than this Key or the species of Cortinarius.

We are able to furnish an additional diversion also in the presentation of matter that amateurs may not have thought of as in the nature of "Mushrooms"—referring to the article on Moulds by Superintendent Sumstine. But these are Fungi, and the word Mycology includes this interesting group. We will be glad for additional articles and notes by patrons of the BULLETIN.

KEY TO THE SPECIES OF CORTINARIUS.

(Continued from p. 315.)

f. Stem marginate-bulbous; gills very narrow and crowded; whole plant violaceous, large .....*C. Michiganensis sp. nov.*

ff. Stem subequal or clavate; gills subdistant, adnate; whole plant violaceous-purple, medium size .....*C. iodes B. & C.*

ee. Pileus not glutinous

f. Flesh and gills turning purple when bruised...*C purpurascens Fr.*

ff. Flesh not turning purple

g. Stem marginate-bulbous; pileus yellowish or brownish, tinged violaceous; medium size .....*C. coerulescens Fr.*

gg. Stem not marginate-bulbous

h. Pileus yellow; gills violaceous to cinnamon; stem white with violaceous apex .....*C. Berlesianus Sacc. & Cub.* (*Syn.=C. tricolor Pk.*)

hh. Pileus and gills lilac; plant small.....*C. crocco-coerulius* (*Pers.*) *Fr.*

ddd. Pileus with neither olivaceous nor violaceous tints (*except the first*)

e. Pileus glutinous

f. Gills olivaceous; pileus brownish-ochraceous.....*C. glutinosus Pk.*

ff. Gills whitish at first

g. Pileus bay-red .....*C. maculipes Pk.*

gg. Pileus pale ochraceous, spores globose..*C. sphaerosporus Pk.*

fff. Gills violaceous at first, spores as in preceding...*C. delibutus Fr.*

ee. Pileus not glutinous

f. Stem marginate-bulbous

g. Gills at first whitish .....*C. multiformis Fr.*

gg. Gills at first blue .....*C. glaucopus Fr.*

ggg. Gills at first yellow.....*C. fulgens* (*Alb. & Schw.*)

ff. Stem not marginate-bulbous, clavate to subequal

g. Gills and stem pallid at first, soon tinged brown

h. Pileus watery-cinnamon to brick-red on disk; in woods *C. glabrellus sp. nov.*

hh. Pileus whitish to pale clay-color; in mushroom and flower-beds .....*C intrusus Pk.*

gg. Gills and apex of stem violaceous at first, soon brownish *C. lanatipes Pk.*

ggg. Gills and pileus drab-gray; viscid universal veil present *C. sterilis Kauff.*

B. Cuticle of pileus not composed of gelatinous cells, hence never viscid nor gelatinous. [*Inoloma, Talamonia, Dermocybe, and Hydrocybe.*]

a. Spores 12-16μ long

b. Pileus rather large, squamulose; whole plant dark violaceous *C. violaceus Fr.*

bb. Pileus small, chestnut color; stem white; spores 16x11μ.... *C. sericipes Pk.*

aa. Spores 10-12μ long

b. Plants small, 2-4 cm. tall

c. Pileus hygrophanous, glabrous, bay-red (moist); gills subrochraceous .....*C. badius Pk.*

cc. Pileus not hygrophanous, densly fibrillose; gills yellow *C. aureifolius Pk.*

bb. Plants larger

c. Stem distinctly sheathed or ringed by the universal veil

d. Pileus tawny; stem with cinnabar-colored, persistent, concentric rings .....*C. armillatus* (*Alb. & Schw.*)

dd. Pileus purplish-brown, copper-brown, etc., to drab; stem peronate, i. e., sheathed with a universal veil..*C. torvus Fr.* *C. torvus nobilis Pk.*

ddd. Pileus tinged yellow or rufous; stem peronate and annulate by a white universal veil .....*C. canescens Pk.*

cc. Stem not sheathed or ringed; the universal veil evanescent or absent.

d. Pileus hygrophanous, fibrillose-squamulose (like C. paleaceus)

e. Pileus dingy chestnut (moist); stem long and slender...*C. gracilis Pk.*

ee. Pileus grayish; stem stout and short, bulbous.....*C. grieseus Pk.*

dd. Pileus not hygrophanous, merely silky or innately fibrillose

e. Pileus reddish-gray, tinged purplish; gills purple or violaceous; spores 10-12μ long .....*C. pulchrifolius Pk.*
C. rubrocinereus Pk.

ee. Pileus, stem and gills lilac; spores 9-10μ.....*C. lilacinus Pk.*

eee. Pileus, stem and gills violaceous at first; spores 10-12μ long....
C. rimosus Pk.

aaa. Spores 4-9μ long; if longer, plants are whitish or violaceous

b. Stem and pileus scaly or shreddy

c. Scales red (scarlet to vermillion).....*C. bolaris Fr.*

cc. Scales brown to blackish

d. Plant large, watery-spongy, soon dark chocolate colored.
C. squamulosus Pk.

dd. Plants of medium size, wood-brown....*C. pholideus Fr.*

bb. Stem not scaly.

c. Stem with more or less persistent annular rings, or peronate

d. Plants large, 2-8 cm. or more tall; pileus in proportion

e. Pileus watery-cinnamon (moist); gills very distant....*C. distans Pk.*

ee. Pileus buff, ochraceous, clay-colored or tawny

f. Gills at first yellow or yellowish

g. Pileus at first buff; stem peronate by the thin universal veil..
C. flavifolius Pk.

gg. Pileus ochraceous to ferruginous; subannulate.....
C. Morrisii Pk.

ggg. Pileus at first tawny-yellow, with pointed squamules on disk; peronate by tawny-yellow universal veil.....
C. annulatus Pk.

ff. Gills at first brownish or ochraceous; pileus rufous-ochraceous

g. Spores elliptical.....*C. bivelus Fr.*

gg. Spores spherical, minute, 4-5μ diameter .....
C. subbivelus sp. nov.

eee. Entire plant saffron-yellow.....*C. croceocolor Kauff.*

eeee. Pileus some shade of blue or purple when young, buff to tan when old

f. Plants stout, umber-purple to buff; pileus punctate; in or near swamps, in large troops.....*C. umidicola Kauff.*

ff. Mature plants rather slender; pileus fawn-colored, tinged lavender when young, not punctate; common in hemlock woods....
C. deceptivus Kauff.

dd. Plants small, subannulate; pileus less than 3-4 cm. broad

e. Pileus fuscous, covered with white villose fibrils.....
C. paleaceus (Weinm.) Fr.

ee. Pileus not villose-squamulose, cinnamon to chestnut color

f. Gills and stem violaceous at first.....*C. subflexipes Pk.*

ff. Gills and stem pallid to brownish

g. On rotten wood; pileus watery cinnamon..*C. ligniarius Pk.*

gg. On ground or moss; pileus bay to chestnut brown; annulus often distinct.....*C. castaneoides Pk.*

cc. Stem with no annulus, or annulus evanescent

d. Stem bulbous or clavate

e. Bulb depressed-marginate; gills heliotrope purple when young..... *C. obliquus Pk.*

ee. Bulb clavate to subclavate

f. Color of plant lilac to violaceous-white

g. Plants of medium size, violet tinge evanescent, never yellowish .....*C. alboviolaceus (Pers.) Fr.*

gg. Plants medium to large, lilac tinge persistent..*C. lilacinus Pk.*

ggg. Plants medium to small, violaceous to cinereous, tinged yellow or brown.....*C. simulans Pk.*

ff. Color of plant deep chrome, unchanging.....*C. callisteus Fr.*

fff. Color of plant watery-cinnamon or rufous-cinnamon (moist)

g. Stem whitish, pileus rufous-cinnamon to tan; not hygrophanous.....*C. subsalmoneus sp. nov.*

gg. Stem red; pileus hygrophanous, pinkish-ochraceous (dry).. *C. rubipes Kauff.*

dd. Stem subequal or tapering downward

e. Pileus distinctly hygrophanous

f. Plant small; pileus 2 cm. broad or less

g. Gills and stem violaceous when young

h. Stem stout, smooth; spores 7-9μ long..... *C. castaneus (Bull.) Fr.*

hh. Stem slender; spores 6-7μ long

i. Gills and stem pale reddish violaceous at first; pileus blackish-brown; in woods.....*C. subflexipes Pk.*

ii. Gills dark-violaceous at first; pileus fuscous, tinged violaceous; on sphagnum.....*C. fuscoviolaceus Pk.*

gg. Gills ochraceous, pale; stem whitish, not slender..... *C. pulcher Pk.*

ff. Pileus broader than 2 cm.

g. Pileus tawny orange to cinnamon; stem pale..... *C. armeniacus (Schaeff.) Fr.*

gg. Pileus watery-cinnamon; gills very distant....*C. distans Pk.*

ggg. Pileus and stem pale lavender; stem long and attenuated .....*C. everneus Fr.*

ee. Pileus not hygrophanous

f. Pileus chestnut or cinnamon color

g. Stem whitish, soon dingy to brownish....*C. castanellus Pk.*

gg. Stem yellow, no oblivaceous tinge

h. Gills at first yellow.....*C. cinnamomeus (L.) Fr.*

hh. Gills at first flame scarlet..... *C. semisanguineus flamineus Kauff.*

hhh. Gills at first dark blood-red....*C. semisanguineus Fr*

ff. Pileus tawny-olive; stem yellow, tinged olivaceous.....
C. croceus Fr.

fff. Pileus and stem scarlet or blood red

g. Pileus broad as compared with the rather short stem; spores 8 x 5μ.....*C. cinnabarinus Fr.*

gg. Pileus narrow; stem longer; spores 6 x 4μ.....
C. sanguineus (Wulf.) Fr.

FIG. 245.—EARTH-STAR. GE-AS'-TER MIN'-I-MA.—A rather common plant here shown in natural size. The cut was made from specimens sent by Supt. M. E. Hard, who collected them near Chillicothe, Ohio, November 9, 1905.

CORRECTION.—The above half-tone was issued on p. 201 as Geaster triplex, which was a mistake; it should have been Geaster minima as here given. Both of these species were received at the same time and inadvertently the name of the little species got wrong in print.

MOULDS.

By David R. Sumstine.

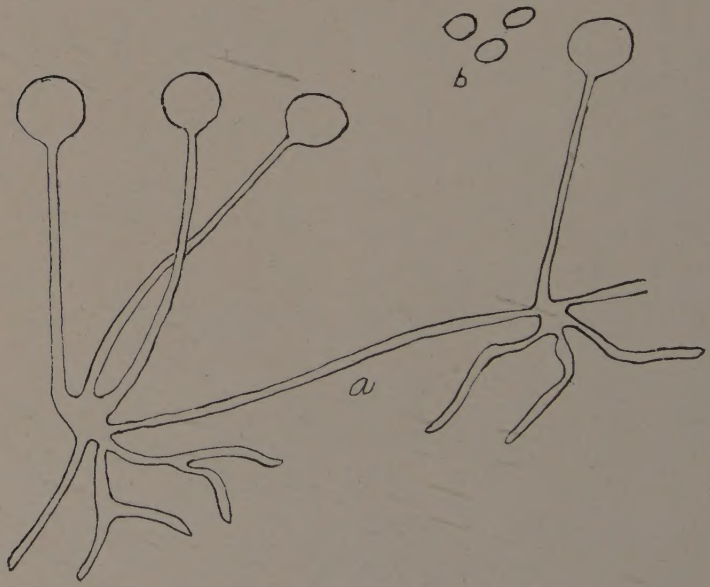
It is not necessary to go to the fields and the forest in search of plants. The kitchen, the cupboard, the cellar, the manure heap about the barn, the decaying vegetable matter about the garden or about the house have a distinctive flora as interesting as the flora of field and forest. The plants of the latter flora are more conspicuous, but the plants of the former flora are just as beautiful and have just as interesting life history and in the economy of nature are just as useful.

There are many genera and species represented in this flora but only a few belonging to the family *Mucoraceae* will be discussed at this time. These plants are commonly called *Moulds,* but all the so-called Moulds do not properly belong to this family. This is especially true of the common green mould found on canned fruit. It belongs to an entirely different family.

A piece of bread or sweet potato laid in a moist place for a few days will produce plenty of specimens for study. It seems that the spores of moulds float in the air and fall upon various substances. Whenever the proper conditions of temperature and moisture are supplied the spores germinate and develop. The spores retain the power of germination for a long time.

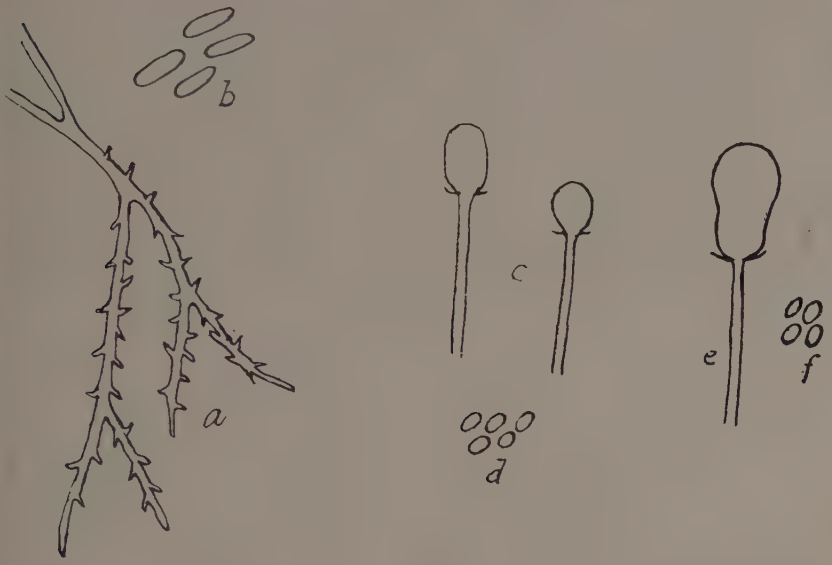
A little observation will show the thread like mycelium spreading in and upon the substratum. At different parts of the mycelium *sporangiophores* arise. At the top of the sporangiophores are developed the sporangia containing spores.

The following species can be found almost anywhere during the summer months:



Mucor mucedo. a Sporangiophores. b Spores.

Fig. 246. Illustrations of Moulds.



a Spinulose mycelium of Mucor fusiger. b Spores of same. c Columella of Mucor stercoreus. d Spores of same. e Columella of Phycomyces nitens. f Spores of same.

Fig. 247. Illustrations of Moulds.

MUCOR.

This genus is characterized by simple or branched, but not dichotomously branched, sporangiophores. The membrane of the sporangium is not cuticularized and soon disappears. The sporangia are of one kind and are furnished with columella.

Mucor mucedo Linnaeus.

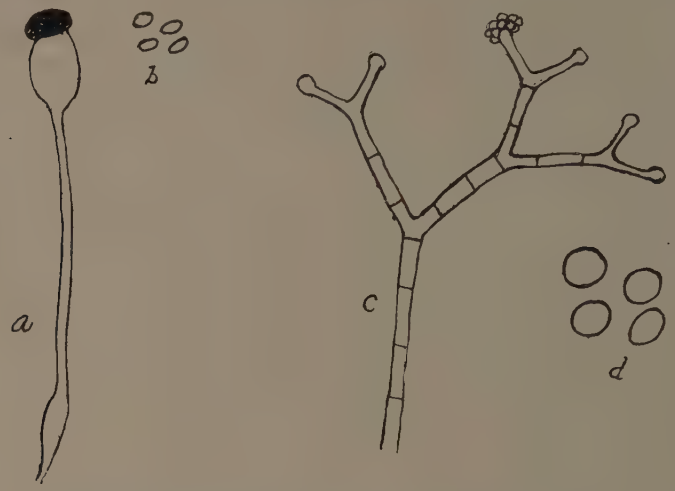
The mycelium is white at first, then brown or even black. The sporangiophores are usually in clusters of three or more, reaching 5 mm. in height. The columella is very prominent, but finally collapses. The spores are globose, oval or irregular. This is the common black mould of bread. The following names are also given to this species, *Mucor stolonifer, Rhizopus nigricans.*

Mucor stercoreus (Tode) Link.

The sporangiophores are erect, undivided, gray: the sporangia are large, yellowish, brownish when old; the membrane disappears and leaves a collar at the base; the columella is variously shaped, cylindrical or conical; spores somewhat elliptical. It grows on dung. *Mucor mucedo* Fresenius has also been applied to this mould.

Mucor fusiger Link.

The sporangiophores are simple, erect, bulbous below, but attenuated upwards, gray to brown in color; columella is large; spores spindle shaped; the aerial mycelium is divided into thorny branches. It grows on Agarics.



a Sporangiophore of Pilobolus crystallinus. b Spores of same. c Sporangiophores of Sporodinia aspergillus. d Spores of same.

FIG. 248. ILLUSTRATIONS OF MOULDS.

PHYCOMYES.

In general appearance the species of this genus resemble the species of *Mucor*. The chief difference is in the formation of zygospores. The metallic appearance will generally separate it from *Mucor*.

PHYCOMYCES NITENS (AGARDH) KUNZE.

The sporangiophores are simple, olive brown, very large, 7-30 cm. long; the sporangia are round, large; columella, pear shaped; spores ellipsoid. It grows on oily substances. Ground flax seed makes a good medium for cultivation.

PILOBOLUS.

This genus is easily recognized by the peculiar formation of the sporangium whose upper part is cuticularized. The sporangiophore is very much enlarged or distended right below the sporangium.

PILOBOLUS CRYSTALLINUS (WIGGERS) TODE.

This is common on horse dung. The sporangium is black and at maturity is thrown off with considerable force; the spores are colorless or yellowish.

SPORODINIA.

This is a monotypic genus and is known by the dichotomously branched sporangiophores.

SPORODINIA ASPERGILLUS (SCOPOLI) SCHROETER.

The sporangia are variously colored, but usually brown or black at maturity. The spores are round or ellipsoid. It grows on Boleti and Agarics.

All figures were drawn by Stella Sumstine, not to any definite scale.

The Mycological Bulletin is issued Monthly, Price 25c. Copies of Vol. II (1904), Vol. III (1905) and Vol. IV (1906) may be had for 50 cents each, or cloth bound copies for 75 cents. No copies remain of Vol. I (1902). Address W. A. Kellerman, Columbus, Ohio